Assessment of Methods to Quantify Livestock Associated MRSA in Pig Herds

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Methods to quantify livestock associated MRSA in pig herds

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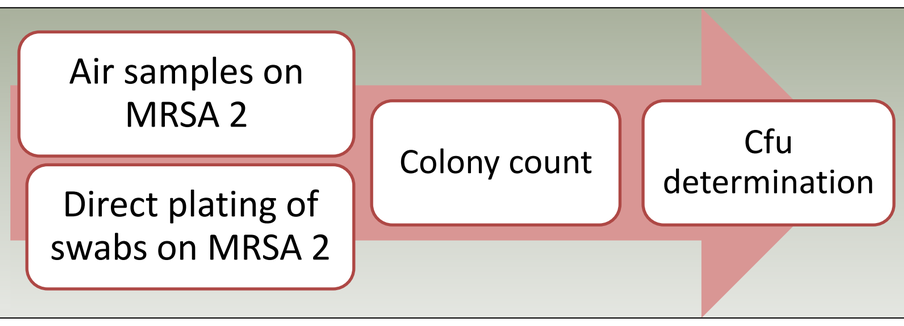
Background A high prevalence of LA-MRSA, especially in the pig production, has been reported from many countries. However, there is a lack of knowledge about the actual LA-MRSA loads on infected farms. The overall MRSA level is low in Denmark and if the reservoir of LA-MRSA starts to spread into the community, the MRSA level in general could increase. We do not believe it is possible to eliminate LA-MRSA in the pig production, but we have an ambition of being able to lower the level. In order to try and control LA-MRSA, it is highly relevant to be able to quantify LA-MRSA in the farm environment and on livestock which would enable us to rank risk factors in the production chain and to assess the effect of possible intervention strategies.

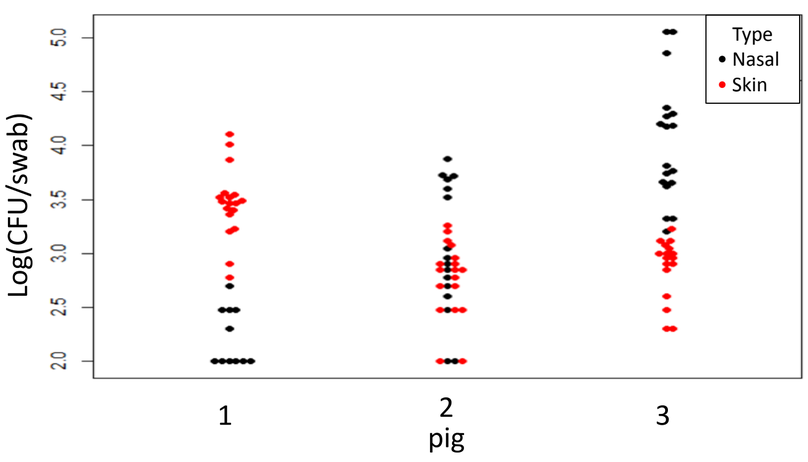
Purpose The present study was undertaken to assess methods to quantify LA-MRSA on animals and in the environment in pig herds. In addition, the role of flies as potential environmental carriers of LA-MRSA was investigated.

Method

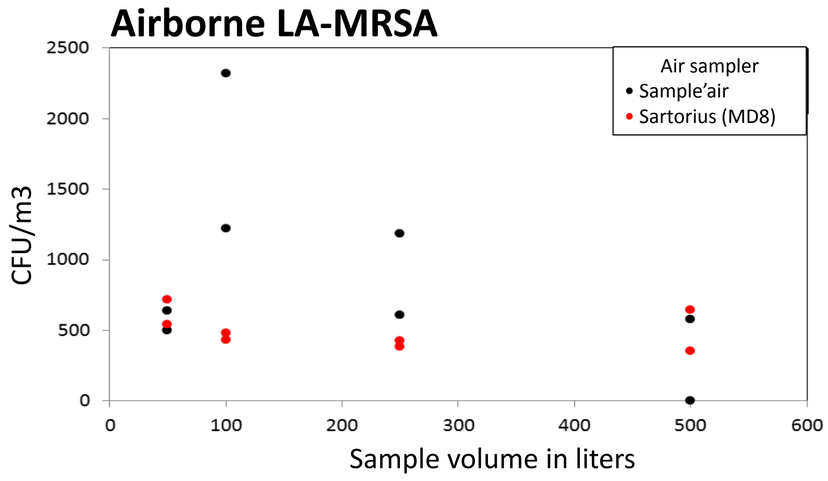


Results

Method verification



Airborne LA-MRSA



Load in weaning pigs (n=15)

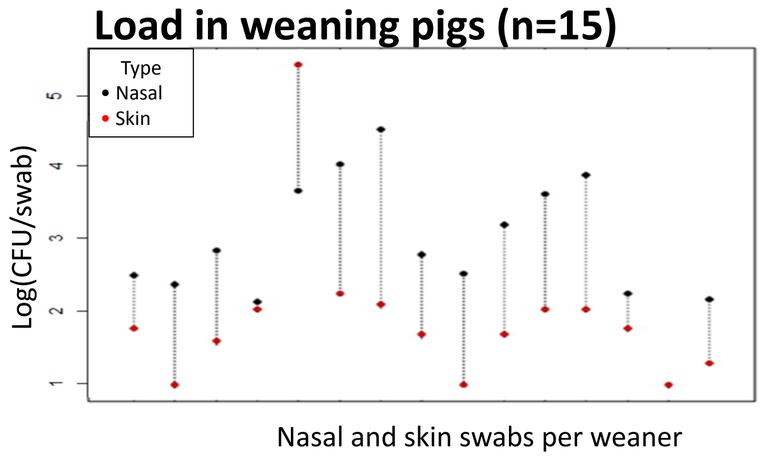


Table 1. Proportions of variance

Source	Nasal swabs		Skin swabs	
	Variance	%	Variance	%
Bio. replicate	0.37	24	0.08	31
Pig	1.11	72	0.13	53
Residual	0.06	4	0.04	15
Total	1.54	100	0.25	100

CFU based on counts from 10^{-0}, where the 10^{-1} counts were zero

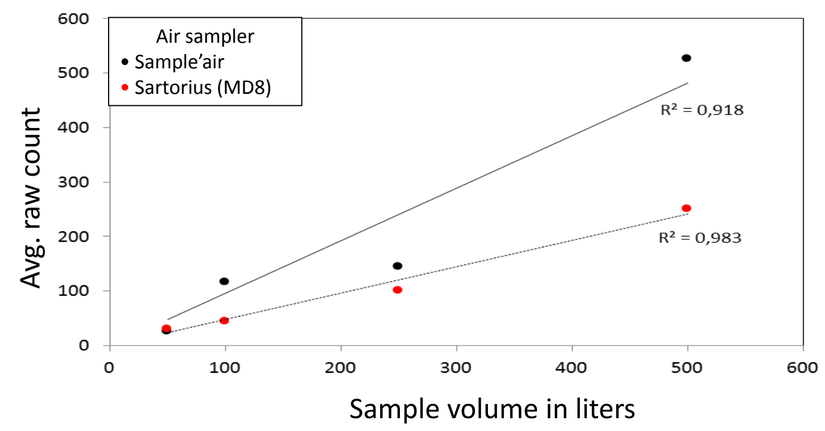


Table 2. Range of MRSA loads.

	Range of MRSA load
Nose	$6.6\text{-}\times10^{1}\text{-}3.9\times10^{4}$ cfu/swab
Skin	$1.1\times10^{1}\text{-}2.6\times10^{5}$ cfu/swab
MD8	$4.1\times10^{2}\text{-}6.3\times10^{2}$ cfu/m^3

Nasal swabs seemed to cause greater variation in the results than use of skin swabs and a larger proportion of the variance could be explained by the difference between pigs.

The Sartorius air sampler yielded the most stable detection level of LA- MRSA and the increasing raw counts detected corresponded better with increasing air volumes.

Loads in the 15 weaning pigs supported the results seen in the method verification. Air load and skin load seemed similar while nasal load was higher. MRSA was found on flies, in pools of 5 and individually, after enrichment.

Conclusion Fast quantification of the animal MRSA load in pig herds is possible by direct plating of either nasal or skin swab samples. The Sartorius MD8 air sampler provides fast environmental quantification and it was possible to detect MRSA in flies with animal contact demonstrating their potential as environmental MRSA carriers.

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